SURVEY OF WASTEWATER DISCHARGE

Eielson AFB, Alaska

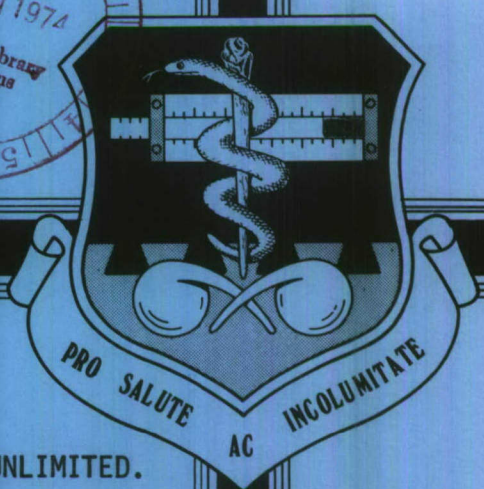
EHL(K) 73-24

December 1973

USAF ENVIRONMENTAL

HEALTH LABORATORY

KELLY AFB, TEXAS



USAF ENVIRONMENTAL HEALTH LABORATORY (AFLC)

UNITED STATES AIR FORCE

KELLY AFB, TEXAS 78241

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N O T I C E

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I. SUMMARY

This report contains the results of a wastewater survey at Eielson AFB, Alaska, conducted by the USAF Environmental Health Laboratories, Kelly AFB, Texas and McClellan AFB, CA, between 22 and 27 June 1973.

Most wastewaters generated on Eielson AFB are discharged to the Base sanitary sewage system for treatment, with subsequent discharge to Garrison Slough. Current treatment consists of primary sedimentation and sludge digestion. The effluent from the treatment plant is not chlorinated prior to discharge.

A secondary sewage treatment system is being constructed utilizing an aerated lagoon. This system will be equipped with the necessary equipment to chlorinate the effluent prior to discharge. The Environmental Protection Agency (EPA) has proposed standards to be met by secondary treatment. These standards are included in this report.

There are some untreated washrack wastes entering Garrison Slough. These and other untreated wastes identified and included in this report should be discharged to the sanitary sewage system.

Performance specifications required by AFR 19-1 are included in this report for the sanitary sewage treatment plant.

II. INTRODUCTION

A. Purpose And Objectives

The USAF Environmental Health Laboratories were requested to provide assistance in improving existing water pollution monitoring programs at Eielson AFB, Alaska. This technical report represents the result of the field survey conducted by representatives of both the EHL, Kelly AFB TX and the EHL, McClellan AFB CA at Eielson AFB between 22 and 27 June 1973. The objectives of this survey were as follows:

1. To evaluate the present sampling and surveillance program of the Base waters and identify any additional requirements to meet applicable water criteria.

2. To determine wastewater generating industrial operations and disposal routes.

3. To propose performance specifications for Eielson's wastewater treatment system.

B. Historical Background

1. Between 1 Jan and 31 March 1972, the Eielson AFB Bio-environmental Engineer and his staff conducted a preliminary environmental pollution survey of the base.

2. In May 1972 AAC/SGP requested assistance to improve existing water pollution monitoring programs at Eielson AFB.

3. Between 22 and 27 June 1973, EHL personnel conducted a field survey at Eielson AFB.

III. DISCUSSION

A. General Description of Eielson AFB

1. Base Mission

Eielson AFB has a multitude of missions and functions. Due to its strategic location it is a principal forward strike base. The Base provides training in Arctic survival, serves as an evaluation area for aircraft performance in extreme cold and supports military exercises in winter and summer. The flying missions include weather reconnaissance, air refueling and search and rescue.

2. Geography

Eielson AFB is located in the east central part of Alaska, approximately 26 miles Southeast of Fairbanks. The Base is located on terrain that is plateau in nature and has an elevation of 544 feet above sea level. The area west-northwest and north is over-burdened by 6-12 inches of organic material; underneath to an indefinite depth is a layer of sand and gravel. Ground to the south of the base slopes to the Tanana River and is poorly drained. The area southeast of the base is low and marshy for several miles. The plant coverage adjacent to the base is mostly small scrub-type trees. During the original construction of the base, an immense amount of excavation was required. The entire area was stripped of all tundra and glacial silt. All roads, foundations, and runway installations were excavated down to gravel level.

3. Water Supply

The water supply for the Base is pumped from wells. Approximately one million gallons/day (mgd) are treated by aeration, lime coagulation, sedimentation and sand filtration for iron removal.

4. Sanitary Sewage Treatment

The existing sewage treatment operation provides only primary sedimentation with the effluent being discharged to Garrison

Slough. An aerated lagoon treatment system to augment the present system is under construction and will provide secondary treatment.

B. Industrial Wastewater and Its Treatment

The industrial operations on Eielson AFB contributing the largest volumes of wastewaters consist of such processes as vehicle and equipment washing, potable water treatment, photographic processing and cooling and scrubber water from the power plant.

1. Sources of Industrial Wastes

Appendix I contains a listing of facilities that were visited during the survey. These facilities have demonstrated a pollution potential at other USAF installations. The largest volume of wastewater is generated by the potable water treatment plant. Another large contributor is the outside washrack at the motorpool.

2. Methods of Industrial Waste Disposal

A review of industrial facilities revealed that some industrial wastes are discharged untreated to Garrison Slough. This method of disposal violates Federal and State laws. The majority of industrial wastes are discharged to the existing sanitary sewage system. The existing sanitary system provides primary sedimentation which is inadequate to meet the prevailing criteria.

3. Field Survey Results

Almost all of the industrial area of the base is located in close proximity to Garrison Slough. The wastewaters generated eventually discharge to Garrison Slough either by way of the primary sewage treatment plant or directly through the storm drainage system. A listing of industrial facilities and their routes of wastewater discharge is presented in Appendix I.

a. Untreated Waste Volumes and Characteristics

(1) The potable water treatment plant is a large contributor of untreated wastewater to Garrison Slough. This includes untreated by-pass water and chemicals in solution. The chemicals are discharged into a pond area of Garrison Slough every 15 minutes for 30 seconds with a pump capacity of 240 gallons per minute. The chemicals are lime and Ferric Sulfate.

(2) During summer, water from the power plant cooling pond is sometimes discharged at the rate of 1500 gallons per minute (gpm) to allow for make up water when the return water temperature becomes too high. Also the power plant discharges "sump" water at a

rate of 50-60 gpm to another smaller pond, which removes settleable matter. This pond discharges to a ditch which terminates at Garrison Slough.

(3) During summer the wastewater from washing approximately 20 vehicles per day at the outside washrack for the 5010th Transportation Squadron discharges directly to Garrison Slough. Also, wastewater from washing approximately 25 pieces of equipment/day at the heavy equipment washing area is discharged directly to Garrison Slough.

b. Garrison Slough Water Quality During Survey

A cursory survey of Garrison Slough water quality within the confines of Eielson AFB was performed during the week of 22-26 June 1973. The results of analyses performed on samples obtained at various locations are presented in Table 1. Floating algae mats were observed at all water surface obstructions in the creek downstream from the point where Garrison Slough crosses under loop T/W (1000' downstream from sampling location A). Upstream from this point, the stream is narrow and well shaded by thick growths of trees.

Table 1. Garrison Slough Water Quality Survey

LOCATION	RESULTS OF ANALYSES					
	pH (Units)	Dissolved Oxygen mg/l	Temp (Deg C)	Turbidity (JTU)	PO_4 (mg/l)	N (mg/l)
A. 1000' Upstream from where Garrison Slough flows under Loop T/W	6.7	3.2	12	2.5	0.7	6.0
B. Foot Bridge near Bldg 4419	7.1	9.8	10	10		
C. Bridge Near Bldg 3217	7.1	6.0		10	1.6	6.7
D. Adjacent to Base Service Station (Bldg 3354)	6.9	8.4	10	10		
E. Rear Bldg 3310	7.1	10	11	12		
F. Near Bldg 2350	7.2	11	9	10	1.0	7.0
G. 100' Upstream of STP Outfall	7.2	10.2	11	9		
H. 1500' Below STP Outfall	7.1	8.8	12	27		

C. Sanitary Wastewater And Its Treatment

1. Description of Domestic Waste Treatment Plant

The present sewage treatment plant provides only primary sedimentation for approximately one million gallons/day (MGD) of wastewater. The effluent is discharged to Garrison Slough without chlorination. The treatment system incorporates clarifiers, digesters and sludge removal drying beds.

a. Expected Efficiency

Since the present sewage treatment system is designed to provide only primary sedimentation and sludge digestion, the Biochemical Oxygen Demand (BOD) removal will approximate 30-35% and suspended solids removal about 50%.

b. Efficiency Required to Meet State Standards

During the survey period it was determined that a water use classification has not been adopted by the State of Alaska, Department of Environmental Conservation, specifically for Garrison Slough. However, the State of Alaska proposed revised Water Quality Standards (see Appendix II) require secondary treatment as a minimum for all domestic sewage wastes. The Environmental Protection Agency (EPA) has proposed that the effluent of secondary treatment systems meet the following standards: The monthly average of Biochemical Oxygen Demand (BOD) and Suspended Solids (SS) concentrations must not exceed 30 mg/l with a maximum weekly average of 45 mg/l; the monthly average of fecal coliform concentrations must not exceed 200/100 ml of sample with a maximum weekly average of 400/100 ml; the effluent pH must be within the range of 6 to 9. However, minimum treatment plant efficiency must be 85% removal of both BOD and SS[4].

c. Programmed Corrective Action to Meet State Standards

An aerated lagoon is presently under construction to supplement the primary sewage treatment plant and provide secondary treatment that will yield an effluent quality within the requirements of the State Standards. The lagoon is designed to provide a 16 day detention period and an effluent Biochemical Oxygen Demand (BOD) of 22 mg/l. The system also provides for chlorination of the effluent prior to discharge.

D. Waste Oil Disposal Procedures

Waste lubricating oils and solvents are collected from maintenance activities in 55 gallon drums and delivered to the Fairbanks Property Disposal Office at Fort Wainwright. Oils and lubricants

are not always kept separated. At the time of the survey the property disposal officer had 60,000 gallons of waste oil on hand. Recent attempts to sell this material have been unsuccessful and if the current selling offer is not acted upon, the disposal activity will cease accepting waste oils from Eielson AFB for disposal.

E. Applicable Water Quality Criteria And Proposed Performance Specifications:

1. Background

Appendix II contains Alaska State water quality criteria applicable to Eielson AFB. Executive Order (EO) 11507 and current DOD and USAF directives require Eielson AFB to comply with the water quality criteria adopted by the State of Alaska. Executive Order EO 11507 also requires Eielson AFB to propose "performance specifications" for the base's sewage treatment plant. These performance specifications should be the permissible plant effluent concentrations for designated constituents that would provide for conformance with all applicable receiving water quality criteria adopted by the State of Alaska.

2. General And Specific Criteria

The general water quality criteria prohibit the discharge of untreated and inadequately treated wastewaters. The State of Alaska specifies minimum acceptable treatment required for all domestic sewage wastes is secondary treatment. The State also says all industrial waste discharges are required to have treatment equivalent to best practicable control technology currently available as shall be defined for each industrial waste.

3. Proposed Performance Specifications

The Federal Facilities Coordinator, Environmental Protection Agency in Anchorage, Alaska, was contacted concerning the development of performance specifications for the Eielson AFB sewage treatment plant. The proposed performance specifications are included in Appendix III. They consist of the requirements to be satisfied in complying with the State of Alaska's minimum acceptable sewage treatment and the Environmental Protection Agency's standards for secondary treatment.[4]

F. Compliance With Applicable Water Quality Criteria And Proposed Performance Specifications:

1. Untreated Waste Discharges

Discharge of untreated wastes via the storm drainage system or direct to receiving waters violates the State's general water quality criteria.

2. Sewage Plant Treated Effluent

The present operating sewage treatment plant does not satisfy the State of Alaska minimum treatment requirements. The existing plant was not designed to meet the Biochemical Oxygen Demand or Suspended Solids removal efficiencies necessary to comply with the standards proposed by the Environmental Protection Agency pertinent to the Alaska State requirements. The effluent is not presently being chlorinated prior to discharge so the bacteriological quality is also questionable.

3. Base Water Pollution Surveillance Program

In the past, samples have been collected periodically at various locations throughout the base to demonstrate conformance with applicable water quality criteria. Based on the proposed revised water quality standards for the State of Alaska (see Appendix II), a suggested Base Monitoring Program is outlined in Appendix IV.

IV CONCLUSIONS

A. General

1. Eielson AFB, Alaska is an Alaskan Air Command Base that generates approximately one million gallons of wastewaters per day (mgd) of domestic and industrial origin that receives primary treatment. The majority of the wastewaters are of domestic origin.

2. Current DOD and AF directives require Eielson AFB to comply with the State of Alaska laws regarding water pollution control.

B. Industrial Wastewater Sources and Treatment

1. This report identifies the major sources of industrial wastewater on Eielson AFB. The major contributors of industrial wastewaters at Eielson AFB are vehicle washracks, base potable water treatment facility, photo processing, cooling and scrubber water from the power plant.

2. The most significant untreated wastewaters are the effluents from the 5010th Transportation Squadron vehicle washrack located outside near Building 3213, the heavy equipment operations washing area in Building 3219, the Base potable water treatment facility and some hangar floor drains which discharge directly into Garrison Slough.

3. There are some chemicals from the photographic processing operations being discharged to the sanitary system without silver recovery.

4. The fire department has Light Water® fire fighting foams FC-199 and FC-200. A study on FC-199 completed at the EHL, Kelly AFB, found this foam to be a potential serious pollutant because of its high chemical and biochemical oxygen demand.(1)

5. Ethylene glycol deicer poses a threat to aquatic life. Glycols serve as nutrients for microorganisms with an oxygen demand as they are being degraded. This oxygen demand could result in a depletion of oxygen available to support aquatic life.(2)

6. Isopropyl Alcohol is used as a deicer for runways and also has the potential for depleting oxygen below that required to maintain aquatic life. This was determined by comparing biodegradation studies of Ethylene Glycol and Isopropyl Alcohol.(3)

C. Sanitary Wastewater and Its Treatment

1. Eielson AFB presently provides primary treatment for approximately one million gallons of wastewater per day. The effluent is discharged unchlorinated into Garrison Slough. The existing sewage treatment system is in the process of being upgraded to a secondary system by the addition of an aerated lagoon. The aerated lagoon system is under construction and will also have the necessary equipment to provide for chlorination of the effluent prior to discharge.

2. The present sanitary wastewater treatment system is not designed to comply with State standards.

3. The addition of the aerated lagoon will provide secondary treatment, a requirement of the State of Alaska.

D. Waste Oil Disposal Procedures

The disposal of waste lubricating oils and solvents is a potential large scale problem if the Redistribution and Marketing (R&M) function continues to have difficulty finding buyers for this material.

E. Applicable Water Quality Criteria For The Sewage Treatment Plant Effluent:

Executive Order (EO) 11507 requires Eielson AFB authorities to propose performance specifications for the base's sewage treatment facility to comply with applicable water quality standards. Proposed performance specifications are included in this report.

F. Compliance With Overall Applicable Water Quality Criteria

The base water pollution surveillance program requires revision as recommended in (Appendix IV) to demonstrate, on a continuing

basis, that waste water effluent quality is consistent with criteria applicable to the receiving waters and to accumulate data which will be necessary to apply for a discharge permit under the National Pollutant Discharge System (NPDES).

V. RECOMMENDATIONS

A. General

1. A review of industrial operations discharging generated wastewaters to other than the sanitary system should be accomplished. These operations should discharge into the sanitary system and the feasibility of their relocation to provide this should be evaluated.

2. The Environmental Health Services section should obtain composite sampling equipment such as the Brailsford Model DV-1 (TA906, 15 Dec 72) to aid in determining compliance with the State of Alaska laws regarding water pollution.

B. Industrial Wastewater Sources And Treatment

1. All wastewater generated by maintenance and operational activities should be discharged to the sanitary system for treatment prior to discharge. The discharge of untreated wastewaters from the vehicle washrack near Building 3213, the Heavy Equipment Operations washrack in Building 3219, and the base water treatment plant in Building 3220 are specifically included in this recommendation.

2. The removal of silver from silver containing photo wastes is a mandatory pre-requisite prior to release directly to the environment or indirectly via a sewage treatment plant.(5)

3. Wastewater containing more than 20 ppm (vol/vol) Light Water® should not be discharged to a stream containing aquatic life.(1)

4. When glycol de-icers are used, their discharge directly to a stream should be prevented.(2) This is also true of isopropyl alcohol.

C. Sanitary Wastewater And Its Treatment

1. The effluent from the primary sewage treatment plant should not be discharged to Garrison Slough without being chlorinated. A temporary disinfection procedure should be implemented to prevent the possible transmission of disease to downstream water users until the pending lagoon system is operational with its chlorinating equipment.

D. Waste Oil Disposal Procedures

1. Waste lubricating oils should be segregated and collected separately from waste fuels and solvents. This should enhance remarketing value.

2. If waste lubricating oils are applied to roads for dust suppression some precautions are indicated for those areas where runoff is directly to a high quality water course or where roadside crops are utilized for direct human consumption. This is because only a small percentage of the applied oil will remain in the top inch of road surface and very little penetrates below one inch. The lead concentration in the oil is relatively high and could be carried in windblown dust to contaminate any crops adjacent to an oiled road or be carried in runoff to contaminate a stream.(6)

E. Applicable Water Quality Criteria For The Sewage Treatment Plant Effluent:

The proposed performance specifications outlined in Appendix III for the sewage treatment plant should be adopted. The sampling and analysis program in Appendix III is necessary to demonstrate performance. This program should be implemented by sewage treatment plant personnel.

F. A sampling and analysis program for Eielson AFB is outlined in Appendix IV. As a minimum, this sampling program should be implemented for the base. Results of all analysis should be compared to applicable criteria and retained in a permanent water quality file. The adequacy of this monitoring program should be reviewed periodically and updated as necessary. Note that this program is designed to complement, not eliminate, the routine sampling and analysis to be accomplished by sewage treatment plant operators to demonstrate plant performance.

REFERENCES

1. LeFebvre, E.E., "Biodegradability and Toxicity of Light Water®," Report No. EHL(K) 71-36, USAF Environmental Health Laboratory, Kelly AFB, Texas, Nov 1971.

2. LeFebvre, E.E., and Lamb, N.J., "Biodegradability and Toxicity of Urea and Glycol De-icers," Report No. EHL(K) 72-2, USAF Environmental Health Laboratory, Kelly AFB, Texas

3. Buzzell, J.C., Jr., Young, R.H.F., Ryckman, A.W., "Behavior of Organic Chemicals In The Aquatic Environment, Part II - Behavior In Dilute Systems," Manufacturing Chemists Association, Arpil 1968.

4. 40 CFR, Part 133 - Secondary Treatment Effluent, Fed. Reg, Vol 38, No. 159, 17 Aug 73.

5. LeFebvre, E.E., and Callahan, R.A., "Toxic Effects of Photographic Processing Wastes on Biological Systems," Report No. EHL(K) 70-9, USAF Environmental Health Laboratory, Kelly AFB, Texas, August 1970.

6. Runoff of Oils From Rural Roads Treated to Suppress Dust, EPA-R2-72-054, Oct 1972.

APPENDIX I

Industrial Wastewater Sources and Discharge Routes

Operational and Maintenance activities which have demonstrated a pollution potential at other USAF installations were visited during the survey. Observations and findings are listed below by location rather than functional responsibility.

1. Building 1141:

a. Battery Shop: The Battery Shop was closed at the time of our survey of the building and no personnel were available to answer questions. The Base Environmental Health Service personnel had previously reviewed the Battery Shop and their used acid disposal practices and determined that neutralization procedures are adequate to prevent damage to the sewage system or Sewage Treatment Plant (STP) biota.

b. NDI Shop: The fluorescent dye inspection procedure utilizes ZL-2 penetrant, ZE-3 emulsifier and developer (FSN 6850-782-2723). Since the installation of this operation in August 1972, the vats of the above chemicals have not had to be disposed of.([1]) Fixer from the NDI X-ray operation is collected in drums and taken to R&M for silver recovery (AFR 400-14 Reclamation and Use of Silver).

2. Building 1140: This facility is used almost exclusively for aircraft phase inspections and maintenance. The northerly drain of this hangar discharges to a ditch and then to Garrison Slough. The southerly drain discharges to the golf course pond, thence, to Garrison Slough. Waste engine oils, hydraulic fluid and fuels are collected in drums which are removed and processed by 6th OMS for disposal by R&M. Drip pans are utilized to prevent spillage of waste fluids directly to the floor and building drains. The Tire Shop located in this facility utilizes vats of paint stripper and PD-680 for stripping and cleaning aircraft wheels. Wheels removed from these vats are washed and the washing waste discharged to a floor drain having an unknown termination point. The contents of individual vats are drained to bowsers periodically. These bowsers are reportedly processed by 6th OMS.

3. Building 1120 (Nose Dock #1): This facility houses the aircraft fuel cell repair operation. The nose dock drainage system discharges to an oil separator located on the southeast side of the hangar. Underflow from the separation discharges to the sanitary sewage system. Shop personnel were unaware of the existence of the separator or of any requirement to have the separator serviced to remove accumulated fuels.

4. Building 1151 (Nose Dock #2): This facility is currently used as a storage facility. No personnel were on duty at this location at the time of our visit.

5. Building 1152: The 5010th AGE Shop utilizes this facility to wash and maintain aerospace ground equipment. Approximately 60 pieces of AGE are washed at this location each month. The drainage from the washing area is discharged to the sanitary sewage system.

6. Building 1128: This building is utilized by 5010th AGE personnel for warm storage of equipment and to remove paint from AGE. The stripping rack drain discharges through a small trap (to collect heavy particles) to the sanitary sewage system. A Turco Paint and Lacquer Remover is used at a rate of 50 gallons/week at this location.

7. Building 1226 (Birchwood Hangar): The 5010th CAM Sq utilizes this hangar for the maintenance of base O-2 and T-33 aircraft. The nine O-2 and three T-33 aircraft are each washed once per month at this location. The hangar drains discharge to the sanitary sewage system. Waste engine oil, hydraulic fluid, and fuel is collected in drums and turned in to R&M.

8. Building 3213: The 5010th Transp Sq utilizes this facility for vehicle general purpose maintenance and body work. All waste engine oil, hydraulic fluid, and fuels are collected in drums and picked up by R&M. The floor drains discharge to either of two holding tanks which are pumped out approximately twice each year by a civilian contractor. During the summer approximately 20 vehicles a day are washed at the motor pool washrack located outside on the southeast side of building 3213. Wastewater from this operation drains directly to Garrison Slough.

9. Building 3219: This facility is utilized by heavy equipment operations personnel as a washing area. Approximately 25 pieces of equipment/day are washed at this location. Wastewater drains directly to Garrison Slough.

10. Building 2351: The 5010th Transp Sq utilizes this facility to maintain refueling vehicles. Waste oils and fuels are collected in 55 gallon drums which are picked up by or delivered to R&M. Shop floor drains and the steam cleaning room drains discharge to a separator prior to entering the sanitary sewer. This facility has the only wash rack where vehicles can be washed in the winter. The washrack workload averages five vehicles/day during the winter, but is not utilized to any extent during the summer.

11. Building 3228: This building houses the base potable water treatment plant. Approximately one million gallons/day (MGD) is treated by aeration, lime coagulation, sedimentation, and sand filtration for iron removal. Calcium carbonate sludge and filter backwash wastewater are discharged directly to Garrison Slough. Lime usage averages 12-1600 lbs per day.

12. Building 3112: OL-A, Det 5, 1365th Photo Sq operates in a small section of this building, processing color and black and white negatives and black and white prints. Presently, the chemicals from the black and white processor, that processes approximately 2,000-3,000 feet of 35mm and about 200 feet of 16mm film each month, go down the drain to the sanitary sewer without silver recovery. This processor will be replaced by a Versomat Model 11-CM when the Photo Shop is relocated by the end of December 1973. Once operational, silver will be recovered from the fixer used with the Versomat 11-CM. Fixer from the black and white print operation is collected and delivered to R&M for silver recovery. About five gallons of C-22 process chemicals are discharged to the sanitary sewer every three weeks without silver recovery. Approximately 32 gallons of E-4 process chemicals are discharged to the sanitary sewer every two weeks without silver recovery.

13. Building 6203 (Power Plant): The Power Plant utilizes a recirculating pond to cool the condensed boiler water. During summer operation it is sometimes necessary to discharge water from the cooling pond and provide make-up water if the return water temperature becomes too high. This pond is treated with copper sulfate and Diquat to control aquatic growth. The discharged or "overboarding" is accomplished at a rate of 1,500 gpm. The power plant also discharges "sump" water at a rate of 50-60 gpm to another smaller pond, which removes settleable matter. The discharge from this pond enters a ditch which terminates at Garrison Slough. The "sump" water comes from leakage in assorted packing glands and scrubber water.

14. Building 4371 (Entomology Section):

a. Insecticides: The Entomology Section of Sanitation Services is located in this building. Pesticide and herbicide usages for the base are controlled by this section. Malathion (95 per cent strength) is used for the control of mosquitos. This insecticide is dispersed with an ultra low volume apparatus. Mosquito control is conducted between the last week of May and the first week of August. Other insecticides in use for cockroaches, etc., include Diazinon and Pyrethrum.

b. Herbicides: Hyvar X is used at the rate of 20 pounds per acre around the POL area, along fences, around utilidoors and places inaccessible with power mowers. Ammate X is used to control brush along ditches. Diquat is used in the power plant cooling ponds for control of aquatic plants. Copper sulfate is used to control algae growth in these ponds.

15. Building 1206 (Fire Department): The Fire Department presently has two Light Water fire fighting foams on hand, FC-199 and FC-200. At the time of the survey they had not used any of the FC-200 in their

fire drills. Approximately twelve drills are conducted each month using about 120 gallons of FC-199 per month.

16. Aircraft and Runway De-icing: De-icing of aircraft is accomplished by using Ethylene Glycol. Last year approximately 2,900 gallons of Ethylene Glycol were issued. Also, about 65,000 gallons of Isopropyl Alcohol were used to control ice on the runways during the winter of 1972-1973.

REFERENCE

1. Bullock, C.W., "Toxicity and Biodegradability of Penetrant Inspection Compounds," Report No. EHL(K) 72-16, USAF Environmental Health Laboratory, Kelly AFB, Texas, July 1972.

APPENDIX II

State of Alaska Proposed Revised Standards

TITLE 18. ENVIRONMENTAL CONSERVATION 18 AAC 70.010
CHAPTER 70. WATER QUALITY STANDARDS 18 AAC 70.020

Section

18 AAC 70.010. WATER QUALITY STANDARDS. (a) The water quality standards set forth in this chapter shall apply to all waters of the state.

(b) Waters whose existing quality is better than the established standards shall be maintained at that high quality unless it has been affirmatively demonstrated to the department that a change is justifiable as a result of necessary economic or social development and that change shall not preclude present and anticipated use of such waters. Any industrial, public or private project or development which would constitute a new source of pollution or an increased source of pollution to high quality waters shall provide the highest degree of practicable treatment to maintain the high water quality. In implementing this policy, the Administrator of the Environmental Protection Agency will be kept advised in order to be able to discharge his responsibilities under the Federal Water Pollution Control Act as amended. (In effect before 7/28/59; a m. 5/24/70, Register 34; a m. 8/28/71, Register 39; a m.10/22/72, Register 44).

AUTHORITY: AS 46.03.010
AS 46.03.020(10)(A)
AS 46.03.070
AS 46.03.080

18 AAC 70.020. ESTABLISHMENT OF WATER USE CLASSIFICATION AND CRITERIA. (a) There are established seven water use classifications which are designated by the letters "A" through "G", inclusive. The water use classifications are as follows:

ATTACHMENT 3

(1) Class A. Water supply, drinking, culinary, and food processing without the need for treatment other than simple disinfection and simple removal of naturally present impurities.

(2) Class B. Water supply, drinking, culinary, and food processing with the need for treatment equal to coagulation, sedimentation, filtration, disinfection, and any other treatment processes necessary to remove naturally present impurities.

(3) Class C. Water contact recreation.

(4) Class D. Growth and propagation of fish and other aquatic life, including waterfowl and furbearers.

(5) Class E. Shellfish growth and propagation, including natural and commercial growing areas.

(6) Class F. Agricultural water supply, including irrigation, stock watering, and truck farming.

(7) Class G. Industrial water supply (other than food processing).

(b) The water quality criteria applicable to each water use classification are as follows.

Parameters / Water Uses	Organisms (see note 1)	or % Saturation	(see note 3)
A. Water supply, drinking, culinary and food processing without the need for treatment other than simple disinfection and simple removal of naturally present impurities.	Mean of 5 or more samples in any month less than 50 per 100 ml, except ground water shall contain zero per 100 ml.	Greater than 75% saturation or 5 mg/l.	Between 6.5 and 8.5
B. Water supply, drinking, culinary, and food processing with the need for treatment equal to coagulation, sedimentation, filtration, disinfection, and any other treatment processes necessary to remove naturally present impurities.	Mean of 5 or more samples in any month less than 1000 per 100 ml, and not more than 20% of samples during one month may exceed 2400 per 100ml, except ground water shall contain zero per 100 ml.	Greater than 60% saturation or 5 mg/l.	Between 6.5 and 8.5
C. Water Contact Recreation	Same as B-1	Greater than 5 mg/l.	Between 6.5 and 8.5
D. Growth and propagation of fish and other aquatic life, including waterfowl and furbearers.	Same as B-1 to protect associated recreational values.	Greater than 6 mg/l in salt water and greater than 7 mg/l in fresh water	Between 7.5 and 8.5 for salt water. Between 6.5 and 8.5 for fresh water.
E. Shellfish growth and propagation including natural and commercial growing areas.	Not to exceed limits specified in National Shellfish Sanitation Program Manual of Operations, Part 1, USPHS. (see note 2)	Greater than 6 mg/l in the larval stage. Greater than 5 mg/l in the adult stage.	Between 7.5 and 8.5
F. Agricultural water supply, including irrigation, stock watering, and truck farming.	Mean of 5 or more samples less than 1,000 per 100 ml with 20% of samples not to exceed 2,400 per 100 ml for livestock watering, for irrigation of crops for human consumption, and for general farm use, except ground water shall contain zero per 100 ml	Greater than 3 mg/l	Between 6.5 and 8.5
G. Industrial water supply (other than food processing).	Same as B-1 whenever worker contact is present.	Greater than 5 mg/l for surface water	Between 6.5 and 8.5

(4)	(5)	(6)
Turbidity, measured in Jackson Turbidity Units (JTU)	Temperature, as measured in degrees Fahrenheit (^{o}F)	Dissolved inorganic substances
Less than 5 JTU	Below $60^{o}F$	Total dissolved solids from all sources may not exceed 500 mg/l.
Less than 5 JTU above natural conditions.	Below $60^{o}F$.	Numerical value is inapplicable.
Below 25 JTU except when natural conditions exceed this figure effluents may not increase the turbidity.	Numerical value is inapplicable.	Numerical value is inapplicable.
Less than 25 JTU when attributable to solids which result from other than natural origin.	May not exceed natural temp. by more than $2^{o}F$ for salt water. May not exceed natural temp. by more than $4^{o}F$ for fresh water. No change shall be permitted for temp. over $60^{o}F$. Maximum rate of change permitted is $0.5^{o}F$ per hr.	Within ranges to avoid chronic toxicity or significant ecological change.
Less than 25 JTU of mineral origin.	Less than $68^{o}F$.	Within ranges to avoid chronic toxicity or significant ecological change.
Numerical values are inapplicable.	Between $60^{o}F$ and $70^{o}F$ for optimum growth to prevent physiological shock to plants.	Conductivity less than 1,500 micromhos at $25^{o}C$. Sodium adsorption ratio less than 2.5, sodium percentage less than 60%, residual carbonate less than 1.25 me/l, and boron less than 0.3 mg/l.
No imposed turbidity that may interfere with established levels of water supply treatment	Less than $70^{o}F$.	No amounts above natural conditions which may cause undue corrosion, scaling, or process

(7)	(8)	(9)
Residues including Oils, Floating Solids, Sludge Deposits and Other Wastes	Settleable solids suspended solids (includes sediment & dredge spoil & fill)	Toxic or Other Deleterious Substances, Pesticides, and Related Organic and Inorganic Materials
Same as B-7	Below normally detectable amounts.	Carbon chloroform extracts less than 0.1 mg/l and other chemical constituents may not exceed USPHS Drinking Water Standards. (see note 4)
Residues may not make the receiving water unfit or unsafe for the uses of this classification; nor cause a film or sheen upon, or discoloration of, the surface of the water or adjoining shoreline; nor cause a sludge or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines.	No imposed loads that will interfere with established levels of water supply treatment.	Chemical constituents shall conform to USPHS Drinking Water Standards. (see note 4)
Same as B-7	No visible concentrations of sediment.	Below concentrations found to be of public health significance.
Same as B-7 plus the following: Residues shall be less than those levels which cause tainting of fish or other organisms and less than acute or chronic problem levels as determined by bioassay.	No deposition which adversely affects fish & other aquatic life reproduction and habitat.	Concentrations shall be less than those levels which cause tainting fish, less than acute or chronic problem levels as revealed by bioassay or other appropriate methods and below concentrations affecting the ecological balance.
Same as D-7	No deposition which adversely affects growth and propagation of shellfish.	Same as D-9
Same as B-7	For sprinkler irrigation, water free of particles of 0.074 mm or coarser. For irrigation or water spreading, not to exceed 200 mg/l for an extended period of time.	Less than that shown to be deleterious to livestock or plants or their subsequent consumption by humans.
Same as B-7	No imposed loads that will interfere with established levels	Chemical constituents may not exceed concentrations found to be of public health significance.

Color, as measured in color units	Radioactivity	Aesthetic Considerations	Water Quality Parameters / Water Uses	
True color less than 15 color units.	The following criteria apply to all water uses, Class A through Class G: The concentrations of radionuclides in these waters shall be maintained at the lowest practicable levels and shall not a) Exceed 1/30th of the maximum permissible concentration values in water (MPC_w) given for continuous occupational exposure in National Bureau of Standards Handbook 69 (see note 5); b) Exceed the concentrations specified in the USPHS Drinking Water Standards for water used for domestic supplies (see note 4); c) Result in the accumulation of radioactivity in edible plants or animals that present a hazard to consumers; d) Be harmful to aquatic life;	May not be impaired by the presence of materials or their effects which are offensive to the sight, smell, taste, or touch.	Water supply, drinking, culinary and food processing without the need for treatment other than simple disinfection and simple removal of naturally present impurities.	A
Same as A-10		Same as A-12	Water supply, drinking, culinary, and food processing with the need for treatment equal to coagulation, sedimentation, filtration, disinfection, and any other treatment processes necessary to remove naturally present impurities.	B
Same as A-10		Same as A-12	Bathing, swimming, recreation.	C
True color less than 50 color units.		Same as A-12	Growth and propagation of fish and other aquatic life, including waterfowl and furbearers.	D
True color less than 50 color units.		Same as A-12	Shellfish growth and propagation including natural and commercial growing areas.	E
Inapplicable		Same as A-12	Agricultural water supply, including irrigation, stock watering, and truck farming.	F
True color less than 50 color units		Same as A-12	Industrial water supply (other than food processing).	G

Notes:

1. Organisms of the coliform group shall be determined by Most Probable Number or equivalent membrane filter technique.

2. Wherever cited in these standards, the National Shellfish Sanitation Program, Manual of Operations, Part I, means Sanitation of Shellfish Growing Areas, 1965 revision, U.S. Department of Health, Education and Welfare, Public Health Service Publication No. 33, Part 1, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Price 45 cents), or in any Regional Office of the Department of Environmental Conservation, and which is on file in the office of the lieutenant governor.

3. Induced variation of pH conditions naturally outside this range may not exceed 0.5 pH unit and the pH change shall be only in the direction of this range. pH conditions naturally within this range shall be maintained within 0.5 pH unit of the natural pH.

4. Wherever cited in these standards, USPHS Drinking Water Standards means the Public Health Service Drinking Water Standards, 1962 revision, U.S. Department of Health, Education and Welfare, Public Health Service Publication No. 956, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Price 30 cents) or from any Regional Office of the Department of Environmental Conservation, and which is on file in the office of the lieutenant governor.

5. Wherever cited in these standards, National Bureau of Standards Handbook 69 means the handbook entitled "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and Water for Occupational Exposure", U.S. Department of Commerce, National Bureau of Standards Handbook 69, June 5, 1959, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, or in any Regional Office of the Department of environmental Conservation, and which is on file in the office of the lieutenant governor.

(c) The analytical procedures used as methods of analysis to determine the quality of waters shall be in accordance with the 13th edition of Standard Methods for the Examination of Water and Wastewater, published by the Water Pollution Control Federation, the American Water Works Association and the American Public Health Association, (publication office: American Public Health Association, 1740 Broadway, New York, New York 10019), or in accordance with other standards mutually approved by the department and the U.S. Environmental Protection Agency. (In effect before 7/28/59; am 5/24/70, Register 34; am 8/28/71, Register 39; am 10/22/72, Register 44; am / / , Register).

AUTHORITY: AS 46.03.020(10)(A)
AS 46.03.070

18 AAC 70.030. PROCEDURE FOR DETERMINING WATER QUALITY CRITERIA. In determining the appropriate water quality criteria for any waters or portion of waters, the department shall adhere to the following procedure:

(1) If waters have more than one classification, the most stringent water quality criterion of all the classifications shall apply; and

(2) If a tributary water either receives a sewage waste discharge or industrial waste discharge, or has a lower classification than the confluence water, and the tributary water affects the quality of the confluence water, the most stringent water quality criteria applicable to either the tributary water or the confluence water shall apply to the tributary water; and

(3) Waste Discharge Permits will define a mixing zone outside of which violations of the criteria will be determined. The mixing zone will be limited to a volume of the receiving water that will

(A) not interfere with biological communities or populations of important species to a degree which is damaging to the ecosystem, and

(B) not diminish other beneficial uses disproportionately. In effect before 7/28/59; am 5/24/70, Register 34; am 8/28/71, Register 39; am 10/22/72, Register 44; am / / , Register).

AUTHORITY: AS 46.03.020(10)(A)
AS 46.03.070
AS 46.03.080

18 AAC 70.040. NATURAL CONDITIONS. Waters may have natural characteristics which would place them outside the criteria established by this chapter. The criteria established in this chapter apply to man-made alterations to the waters of the state. (In effect before 7/28/59; am 5/24/70, Register 34; am 8/28/71, Register 39; am 10/22/72, Register 44).

AUTHORITY: AS 46.03.020(10)(A)
AS 46.03.070
AS 46.03.080

18 AAC 70.050. CLASSIFICATION OF STATE WATERS. (a) Waters of the state that have been classified after public hearing, and their designated classes according to the Water Quality Standards are as follows:

(1) Ship Creek - near Anchorage, Alaska - from the Ship Creek diversion structure at river mile 11.5 to the confluence with the Knik Arm of Cook Inlet - Classes B, C, D & G.

(2) Chena River - near Fairbanks, Alaska - from the confluence of the Chena River and Chena Slough to the confluence of the Chena River and Tanana River - Classes C & D. 22A

(3) All marine and estuarine waters - Classes C, D, E & G.

(4) The ground waters of the state - Classes A, B, F & G.

(b) The other fresh waters of the state are generally in their original and natural conditions and as such are considered suitable to serve all classifications established in sec. 20 of this chapter and are so classified, until reclassified. (In effect before 7/28/59; am 5/24/70, Register 34; am 8/28/71, Register 39; am 10/22/72, Register 44; am / / , Register).

AUTHORITY: AS 46.03.020(10)(A)
AS 46.03.070
AS 46.03.080

18 AAC 70.060. PERMITS. Repealed 10/22/72. (In effect before 7/28/59; am 5/24/70, Register 34; am 10/22/72, Register 44).

18 AAC 70.070. TABLE - WATER QUALITY CRITERIA FOR WATERS OF THE STATE OF ALASKA. Consolidated into sec. 20(b) 10/22/72. (In effect before 7/28/59; am 5/24/70, Register 34; am 8/28/71, Register 39; am 10/22/72, Register 44).

18 AAC 70.080. MINIMUM TREATMENT. Secondary treatment is required for all domestic sewage wastes. All industrial waste discharges are required to have treatment equivalent to best practicable control technology currently available as shall be defined for each industrial waste. If secondary treatment for domestic sewage and best practicable control technology currently available for industrial wastes is inadequate to achieve water quality criteria as defined in sec. 20 of this chapter, higher levels of treatment will be required. (Eff. 8/24/70, Register 34; am 8/28/71, Register 39; am 10/22/72, Register 44; am / / , Register).

AUTHORITY: AS 46.03.020(10)(A)
AS 46.03.070
AS 46.03.080
AS 46.03.710

18 AAC 70.081. CERTIFICATE OF REASONABLE ASSURANCE. Upon application to the department, the department may issue to the applicant a certificate that there is a reasonable assurance, as determined by the department, that a proposed activity of the applicant will comply with the requirements of section 401 of the Federal Water Pollution Control Act Amendments of 1972, 86 Stat. 816. (Eff. 12/16/70, Register 36; am 10/22/72, Register 44; am / / , Register).

AUTHORITY: AS 46.03.020(9)
AS 46.03.020(10)(A)

18 AAC 70.082. PUBLIC NOTICE OF APPLICATION. (a) When certification pursuant to sec. 81 of this chapter has been requested, the department shall cause to be published a public notice of the application. The public notice shall invite interested parties to submit to the department comments regarding the proposed certification. Such comments shall be received by the department until 30 days after the publication of the public notice provided for in this section. The public notice may be issued jointly with the federal permitting agency.

(b) The public notice of application shall contain the name and address of the applicant, the activity sought to be certified as in compliance with the water quality standards, the location of the affected waters, and the location and type of discharge.

(c) The public notice of application shall be published at least once in a newspaper having general circulation within the borough in which the proposed activity will take place; however, if the proposed activity will take place in the unorganized borough, or if there is no newspaper of general circulation within the borough, then the newspaper shall be one of general circulation within the judicial district in which the proposed activity will take place. (Eff. 12/16/70, Register 36; am 10/22/72, Register 44; am / / , Register).

AUTHORITY: AS 46.03.020(9)
AS 46.03.020(10)(A)

18 AAC 70.083. PUBLIC HEARING. In addition to the notice of application provision of this chapter, the department may hold public hearings on certification applications. (Eff. 12/16/70, Register 36; am 10/22/72, Register 44).

AUTHORITY: AS 46.03.020(9)
AS 46.03.020(10)(A)

18 AAC 70.084. NOTICE OF PUBLIC HEARING. (a) If a public hearing is to be held, the department shall cause to be published a notice of public hearing in the manner set forth in sec. 82(c) of this chapter. The notice shall contain the time and place of the public hearing, a summary of the certification application and all other information specified in sec. 82 of this chapter. The department may combine the notice of application provided for in sec. 82 of this chapter with the notice of public hearing provided for in this section.

(b) If a public hearing on the application for certification is to be held, it shall be held no sooner than 30 days after publication of the notice of public hearing. At the hearing, the department may receive comments from the public and other individuals, entities, or governmental agencies involved, together with comments from the applicant. Such comments may be filed with the department in writing at or before the time of the hearing, and reasonable oral comments shall be permitted.

(c) Nothing in this chapter shall prevent the consideration of more than one application at any public hearing when proper public notice has been given. (Eff. 12/16/70, Register 36; am 10/22/72, Register 44).

AUTHORITY: AS 46.03.020(9)
AS 46.03.020(10)(A)

18 AAC 70.085. ACTION UPON APPLICATION. The department may take action upon an application for certification any time after a 30 day period has elapsed from the date of publication of the notice provided for in sec. 82 of this chapter. However, if a public hearing is held as provided in sec. 83 of this chapter, the department may act upon the application any time after the public hearing. (Eff. 12/16/70, Register 36; am 10/22/72, Register 44).

AUTHORITY: AS 46.03.020(9)
AS 46.03.020(10)(A)

18 AAC 70.090. IMPLEMENTATION AND ENFORCEMENT PLAN. The plan for implementing and enforcing sec. 80 of this chapter shall be based upon achieving the minimum levels of treatment specified in that section at the time of construction for new discharges and as soon as possible but not later than July 1977 for existing discharges, and the plan shall consist of the following elements:

(1) Waste discharge permits issued by the department and those federal permits issued within the state and certified by the state pursuant to sec. 81 of this chapter;

(2) The Water Pollution Control Program Plan of the department; and

(3) Plans developed by the department while implementing the "continuing planning process" required by sec. 303(e) of the Federal Water Pollution Control Act Amendments of 1972, 86 stat. 816. (Eff. 8/28/71, Register 39; am / / , Register).

AUTHORITY: AS 46.03.020(10)(A)
AS 46.03.060
AS 46.03.070
AS 46.03.080

18 AAC 70.100. PENALTIES. A person who violates any provision of this chapter is guilty of a misdemeanor and upon conviction is punishable by a fine of not more than $5,000 or by imprisonment for not more than one year, or both. Each unlawful act or each day of violation constitutes a separate offence. (Eff. 10/22/72, Register 44).

AUTHORITY: AS 46.03.020(10)(A)
AS 46.03.710
AS 46.03.760

18 AAC 70.110. DEFINITIONS. Unless the context indicates otherwise, in this chapter

(1) "commissioner" means the Commissioner of the Department of Environmental Conservation.

(2) "contact recreation" means any form of recreation involving deliberate or accidental contact with water, including but not limited to swimming, water skiing, fishing, and commercial and recreational boating.

(3) "department" means the Department of Environmental Conservation.

(4) "dredge spoil and fill" means unpolluted solid material including but not limited to sand, silt, clay and rock which may be placed in the waters of the state.

(5) "ground water" means water in the zone of saturation, which is the zone below the water table in which all interstices are filled with water.

(6) "primary treatment" means the method of removal of settleable, suspended and floatable solids from water by the application of mechanical forces or gravitational forces, or both and may include processes such as sedimentation, flotation, screening, centrifugal action, vacuum filtration, dissolved air flotation, and others designed to remove settleable, suspended and floatable solids.

(7) "secondary treatment" means the method of removal of dissolved and colloidal materials that in their unaltered state, as found in water, are not amenable to separation through the application of mechanical forces or gravitational forces or both. Secondary treatment may include processes such as bio-absorption, biological oxidation, wet combustion, other chemical reactions, and adsorption on surface-active media, change of phase, or other processes that result in the removal of colloidal and dissolved solids from waters.

(8) "sheen" means an iridescent appearance on the surface of the water.

(9) "sludge" means a combination of solids and liquids including but not limited to an aggregate of oil or oil and matter of any other kind having a combined specific gravity equivalent to or greater than that of water. Sludge does not mean dredge spoil and fill.

(10) "waters" means lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, straits, passages, canals, the Pacific Ocean, Gulf of Alaska, Bering Sea and Arctic Ocean, in the territorial limits of the state, and all other bodies of surface or underground water, natural or artificial, public or private, inland or coastal, fresh or salt, which are wholly or partially in or bordering upon the state or under the jurisdiction of the state. (am 5/24/70, Register 34; am 8/28/71, Register 39; am 10/22/72, Register 44; am / / , Register).

AUTHORITY: AS 46.03.020(10)(A)
AS 46.03.070
AS 46.03.080

APPENDIX III

Proposed Performance Specifications

1. Correspondence

2. Proposed Performance Specifications
   Wastewater Treatment Facility
   Eielson AFB, Alaska

CC

30 Oct 1973

Performance Specifications Proposed for Wastewater Treatment Facilities, Eielsen AFB, Campion AFS, and Galena AFS, Alaska

U. S. Environmental Protection Agency
Federal Facilities Branch
Federal Building, Rm G-66
605 West 4th Avenue
Anchorage, Alaska 99501

1. Executive Order 11507, 4 Feb 1970 requires performance specifications for wastewaters discharged from Federal installations. Air Force Regulation 19-1 requires this Laboratory to develop performance specifications in consultation with the State and Regional EPA offices having jurisdiction for the particular installation under consideration when we perform consultant surveys concerned with water quality.

2. During the period 22 to 29 June 1973, this Laboratory in conjunction with the USAF Environmental Health Laboratory, McClellan AFB CA, conducted a review of wastewater treatment practices at Eielsen AFB, Campion AFS and Galena AFS Alaska. Personnel conducting the review visited with Mr Brust of your office on 19 June 1973.

3. Attachment 1 is our proposed performance specifications for the wastewater treatment facilities at Eielsen AFB, Campion AFS and Galena AFS. Applications for Permit to Discharge (Short Form A) under the National Pollutant Discharge Elimination System (NPDES) were previously submitted to your Regional office for these installations by the Alaskan Air Command. The proposed performance specifications are based mostly on minimum treatment requirements contained in the Alaska Proposed Revised Standards and the proposed Environmental Protection Agency regulations governing secondary treatment of wastewater (38FR10642). The proposed performance specifications are therefore considered consistent with Executive Order 11507 for conformance with water quality standards and "related plans of implementation."

4. Our technical reports based upon our review of wastewater practices at the three federal facilities will contain recommendations for the performance specifications and other actions that may be required based upon their approval. Your comments on and coordination of the proposed specifications with interested State authorities are requested.

FOR THE COMMANDER

ALBERT M. ELLIOTT, Lt Col, USAF, BSC
Chief, Special Projects Division

1 Atch
Proposed Performance Specifications

Cy to: AAC/SGB
U. S. EPA, Region X

PROPOSED PERFORMANCE SPECIFICATIONS

WASTEWATER TREATMENT FACILITIES

Eielson AFB, Campion AFS, Galena AFS, Alaska

CHARACTER: Treated Domestic and Industrial Wastewaters

VOLUME:

Eielsen AFB:	1,036,000	gallons per day average
Campion AFS:	23,000	" " " "
Galena AFS:	98,000	" " " "

DEGREE OF TREATMENT: As a minimum secondary treatment will be provided with not less than 85% removal of the monthly average 5-day Biochemical Oxygen Demand (BOD_5) and Suspended Solids. Additional treatment will be provided in the event 85% removal results in higher values than that indicated below for Effluent Quality.

EFFLUENT QUALITY:

ITEM	NOT TO EXCEED Weekly Average	Monthly Average
5-day Biochemical Oxygen Demand (BOD_5) in mg/l (1)	45	30
Suspended Solids in mg/l (1)	45	30
Fecal Coliforms Number per 100 mls sample (2)	400	200
Hydrogen Ion Concentration (pH)	6-9	6-9

NOTES:

(1) BOD_5 and Suspended Solids based on arithmetic mean of 24-hour composite samples.

(2) Fecal coliforms based on geometric mean of one effluent portion collected during a 24-hour period.

PROPOSED PERFORMANCE SPECIFICATIONS
WASTEWATER TREATMENT FACILITY
EIELSON AFB, ALASKA

A. APPLICABLE ORDERS AND DIRECTIVES

Executive Order (EO) 11507, 4 Feb 1970 and current DOD and USAF directives require Eielson AFB to comply with the water quality criteria adopted by the State of Alaska. Executive Order 11507 also requires performance specifications for waste treatment facilities on Federal installations. Air Force Regulation 19-1 requires the Environmental Health Laboratory providing a consultative survey to also develop performance specifications for the surveyed installation.

B. PERFORMANCE SPECIFICATIONS

Degree of Treatment: As a minimum secondary treatment will be provided with not less than 85% removal of the monthly average 5-day Biochemical Oxygen Demand (BOD_5) and Suspended Solids. Additional treatment will be provided in the event 85% removal results in higher values than that indicated below for Effluent Quality.

Effluent Quality:

ITEM	NOT TO EXCEED	
	Per Consecutive 7-day Period	Per Consecutive 30-day Period
5-day Biochemical Oxygen Demand (BOD_5) in mg/l (1)	45	30
Suspended Solids (1) in mg/l	45	30
Fecal Coliforms (2) Number per 100 mls sample	400	200
Hydrogen Ion Concentration (pH)	6-9	6-9

NOTES: (1) BOD_5 and Suspended Solids based on arithmetic mean of 24-hour composite samples.

(2) Fecal coliforms based on geometric mean of one effluent portion collected during a 24-hour period.

C. REQUIREMENTS FOR COMPLIANCE

The proposed performance specifications will necessitate a specific sampling and analysis program to insure compliance. This program will provide information for plant operational control but is not intended to preclude or minimize the importance of other operational tests performed by plant operators. Effective monitoring of plant performance will require that results of the sampling and analysis program (Table 1) be collected, interpreted and maintained for future reference. To meet this requirement the results should be tabulated and recorded on the sewage treatment plant operating logs (AF Forms 1462 and 1463).

APPENDIX III

SAMPLING AND ANALYSIS PROGRAM FOR PERFORMANCE SPECIFICATION COMPLIANCE TESTING

LOCATION	SAMPLING PROCEDURE	SAMPLING FREQUENCY	ANALYSES REQUIRED
STP Influent	1 hr intervals, proportional to flow for a 24 hr period	weekly	BOD, SS, pH
STP Effluent	1 hr intervals, either constant volume or proportional to flow for a 24 hr period	weekly	BOD, SS, pH
STP Effluent	Grab	weekly	Fecal Coliform

STP - SEWAGE TREATMENT PLANT
BOD - BIOCHEMICAL OXYGEN DEMAND
SS - SUSPENDED SOLIDS

D. SAMPLE ANALYSIS

Analyses should be performed according to the procedures specified by the latest edition of Standard Methods[1] or Methods for Chemical Analysis of Water and Wastes.[2]

APPENDIX III REFERENCES

1. Standard Methods for the Examination of Water and Wastewater, 13th Ed., 1971, APHA, AWWA, WPCF, 1740 Broadway, New York, NY 10019.

2. Methods for Chemical Analysis of Water and Wastes 1971, EPA Water Quality Office, Analytical Quality Control, Cincinnati OH.

APPENDIX IV

Water and Wastewater Sampling

1. Sampling and Submitting of Samples
2. Water Codes
3. Tests and Preservatives

I. Sampling and Submitting of Samples:

A. All samples submitted to the EHL for analysis should have the following minimum information attached to the sample container and a duplicate copy should be retained by the submitter and filed with the analytical results when they are received. See Table I, this appendix, for recommended sampling of Eielson AFB.

1. Sample Code (see this Appendix)

2. Base Sample Number

3. Date of Collection

4. Sampling Method (Grab, Composite)

a. Time period over which sample was composited and collection interval.

b. Proportioning Method

(1) Constant Volume (CVS)

(2) Flow Proportional (FPS)

(3) Continuous (CS)

5. Description of Sampling Location.

6. Results of Field Analysis Performed at the Time of Collection.

7. Tests or analyses that you desire the EHL to perform. A list of "standard" water and waste water analyses and supplemental information is provided in this Appendix. Requests for special tests should be coordinated with the EHL prior to submission of samples.

8. Name of Person Who Collected the Sample.

9. Type and Quantity of Any Preservatives Added to the Sample.

B. To reduce the manhours expended in the collection of samples, composite samplers such as the Brailsord Model DV-1 (TA906, 15 Dec 72) should be procured and utilized.

APPENDIX IV

Recommended Minimum Base Effluent Sampling and Analysis Program
Eielson AFB

	[1] GARRISON SLOUGH ABOUT 1000 FT UPSTREAM FROM THE POINT WHERE IT CROSSES LOOP T/W	[2] GARRISON SLOUGH EAST OF BUILDING 4307	[3] GARRISON SLOUGH WEST OF BUILDING 3224	[4] SEWAGE TREATMENT PLANT EFFLUENT	[5] GARRISON SLOUGH AT TRANSMITTER ROAD	[6] EFFLUENT FROM POWER PLANT COOLING PONDS
SAMPLE QUARTERLY	X	X	X		X	
SAMPLE MONTHLY				X		
SAMPLE AS NECESSARY TO ESTABLISH QUALITY						X
COMPOSITE SAMPLE BY (CVS, FPS, OR CS) 24 hour composite preferred, 8-24 acceptable	X	X	X	X SHOULD BE 24 HOURS	X	GRAB
PHOSPHORUS	X	X	X	X	X	
NITROGEN	X	X	X	X	X	
CHEMICAL OXYGEN DEMAND (COD)	X	X	X	X	X	
OIL AND GREASE	X	X	X	X	X	
CYANIDE	X	X	X	X	X	X
CADMIUM	X	X	X	X	X	X
CHROMIUM	X	X	X	X	X	X
COPPER	X	X	X	X	X	X
IRON	X	X	X	X	X	X
LEAD	X	X	X	X	X	X
MANGANESE	X	X	X	X	X	X
MERCURY	X	X	X	X	X	X
NICKEL	X	X	X	X	X	X
ZINC	X	X	X	X	X	X
SILVER	X	X	X	X	X	X
PESTICIDES						X
DISSOLVED OXYGEN* (D.O.)	X	X	X	X	X	X
pH*	X	X	X	X	X	X
TURBIDITY*	X	X	X	X	X	
SUSPENDED SOLIDS*				X		X

*THESE ANALYSES SHOULD BE PERFORMED ON SITE.

[1]Compare the results of sample point [2]with results from upstream to determine if sanitary landfill leachate affects Garrison Slough water quality.

[3]Compare with results from upstream to determine the effect of water treatment plant discharges.

[4]Compare with National Pollutant Discharge Elimination System Permit when issued by EPA.

[5]State of Alaska - Proposed Revised Standards (Appendix II)

[6](Same as [4])

II

WATER CODES

SUPPLY WATER SAMPLES

	CODE
Base Drinking Water Distribution System	AA
Boiler Water	AB
Deionized Water	AC
Distilled Water	AD
Irrigation Water	AE
Municipal Water Supply Furnished Base	AF
Industrial Process Water (Raw)	AG
Industrial Process Water (Treated)	AH
Other Treatment Process Water	AI
Raw Surface Water	AJ
Raw Ground Water (Well)	AK
Softened Water	AL
Steam Condensate	AM
Swimming Pool Water	AN
Treated Cooling Water	AO
Untreated Cooling Water	AP
Stream (Upstream of Base)	AQ
Stream Not Receiving Waste Water (Downstream of Base)	AR
Stream Receiving Waste Water (On Base)	AS
Stream Receiving Waste Water (Downstream of Base)	AT
Other Water Sample	AU

WASTE WATER SAMPLES

	CODE
Aircraft & Ground Equipment Washrack Waste Water (Untreated)	BA
Aircraft & Ground Equipment Washrack Waste Water (After Oil Skimming)	BB
Aircraft & Ground Equipment Washrack Waste Water (After Oil Skimming and Sedimentation)	BC
Activated Sludge or Extended Aeration Activated Sludge Treatment Plant Effluent	BD
Automotive Cleaning Waste Water	BE
Battery Shop Waste Water	BF
Chemical Waste Water Treatment Plant Effluent	BG
Chemical Waste Water Treatment Plant Influent	BH
Contact Aeration Treatment Plant Effluent	BI
Domestic Sewage Treatment Plant Influent	BJ
Domestic Sewage Lagoon, Final Effluent	BK
Domestic Sewage, Primary Treatment Effluent	BL
Electroplating Waste Water	BM
Filter Backwash Water	BN
Fuel Tank Cleaning Waste Water	BO
Floor Drain Waste Water	BP
General Storm Drainage Run-Off Waste Water	BQ
Ion Exchange Resin Bed Recharge Waste Water	BR
Missile Propellant Contaminated Waste Water	BS
Other Waste Water	BT
Parts Cleaning Wash Water (Multi-Stage Washers, etc.)	BU
Paint Stripping Waste Water	BV
Photographic Waste Water	BW
POL Storage Waste Water	BX
Mixed Waste Water (Domestic & Industrial Waste)	BY

TESTS AND PRESERVATIVES

PARAMETER	ANALYTICAL METHOD	PREFERRED PRESERVATION METHOD	MINIMUM DETECTABLE (mg/l) except where otherwise noted	MAXIMUM STORAGE PERIOD	MINIMUM VOLUME
ACIDITY	Potentiometric titration (1, 3) Methyl orange - phenolphthalein titration (2) Direct pH measurement (3)	Refrigerate at 4°C	0.1	24 hrs. for most accurate results.	100 ml *
ALKALINITY	Potentiometric titration (1, 3) Methyl orange - phenolphthalein titration (2)	"	1	"	100 ml *
ARSENIC	Silver diethyl dithio carbamate (1, 2, 3)	No special preservation required.	.01	Indefinite	50 ml *
BARIUM	Atomic Absorption	"	<1	"	50 ml *
BERYLLIUM +	"	"	0.01	"	50 ml *
BORON ++	Curcumin (2) Carminic Acid (2, 3) Mannitol titration (2, 3)	"	0.1	" (in polyethylene or crownglass only: overnight in borosilicate)	10 ml *
CADMIUM	Atomic Absorption (1, 2, 3)	5 ml concentrated Nitric Acid per liter	< .01	Indefinite	100 ml *
CALCIUM	Gravimetric (2) Titrimetric (2) Atomic Absorption (1, 3)	No special preservation required except in highly mineralized or unstable waters: in these cases add 5 ml HNO_3 per liter.	0.05	7 days unless acidified: indefinite under these conditions.	100 ml *
C.O.D. ++ (CHEMICAL OXYGEN DEMAND)	Titrimetric (1, 2, 3) Autoanalyzer (3)	2 ml concn. H_2SO_4 per liter May be included without preservation in normal sample with some loss of accuracy.	5	7 days; longer if refrigerated	100 ml
CHLORIDE	Mercuric Nitrate (1, 2) Autoanalyzer (1) Titralyzer (3)	No special preservation required.	1	7 days for most accurate results, longer if refrigerated.	200 ml *
CHLORINATED HYDROCARBON PESTICIDES	Gas Chromatographic, Tritium or electrometric titration detector	Transmission in specially prepared bottles	.01 micrograms Lindane equivalent per liter	24 hours to indefinite, depending on nature of pesticide	1 quart
CHROMIUM +6	S-diphenylcarbazide (2, 3) Atomic Absorption (1)	None	.01	3 days for most accurate results	50 ml *
CHROMIUM (total)	"	2 ml concentrated Sulfuric Acid per liter	.01	indefinite	50 ml
COLOR	Platinum-cobalt (1, 2) Color disc (2, 3)	Refrigeration at 4°C	3 units	24 hours	50 ml *
COPPER	Cuprethol (2, 3) Atomic Absorption (1, 3)	5 ml HNO_3 per liter	.005	indefinite	100 ml
CYANIDE	Pyrazolone (1, 2, 3)	Add Sodium Hydroxide to pH 10 minimum.	.01	24 hours for most accurate results.	100 ml (1 liter if total cyanide is required)
FLUORIDE	Autoanalyzer complexone (1) Zirconium-Alizarin (2) Autoanalyzer SPADNS (3)	None	0.1	7 days for most accurate results	50 ml *
HARDNESS	EDTA titration (1, 2) Calculation (2, 3)	See Calcium, above	3	See Calcium, above	None, if calculated.
IRON	Phenanthroline (2) Atomic Absorption (1, 3)	5 ml HNO_3 per liter	<.05	indefinite	50 ml
LEAD	Dithizone (2) Atomic Absorption (1, 2, 3)	"	<.01 (lower by concentration methods)	"	50 ml
MAGNESIUM	Atomic Absorption (1, 2, 3)	See Calcium, above	0.01	See Calcium, above	50 ml *
MANGANESE	Periodate (2) Atomic Absorption (1, 2, 3)	5 ml HNO_3 per liter	.01	Indefinite	50 ml
MERCURY ++	Flameless Atomic Absorption (1, 3)	5 ml HNO_3 per liter; add HNO_3 to sample bottle before adding water.	<.01	approximately 10 days	100 ml
METHYLENE BLUE Active Substances (MBAS) Surfactant: ABS; LAS.	(1, 2, 3) Methylene Blue Extraction	None required	0.1	indefinite (except in grossly polluted waters, 10 days approximately)	500 ml *
NITROGEN: NITRATE (N)	Phenoldisulfonic Acid (2) Auto-analyzer, reduction, diazotization-coupling (1, 3)	40 mg $HgCl_2$ per liter. Freeze. Keep frozen in transit.	.05 (as N)	7 days	50 ml
NITRITE (N) +	Griess-diazo (Saltzman) (3) Oxidation (2) Auto-analyzer, diazotization-coupling (1, 3)	"	.05 (as N)	7 days	50 ml
AMMONIA (N) ++	direct Nesslerization (2, 3) Phenate (1, 2, 3) Distillation-titration (2, 3)	"	<.1 (as N)	7 days	500 ml

(1) E.P.A. "Methods for Chemical Analysis of Water and Wastes" (1971)
(2) APHA-AWWA-WPCF - "Standard Methods for the Examination of Water and Waste Water" (1971)
(3) EHL Preferred Practice

* May be included in conventional 1 gallon sample
\+ Not routinely performed
++ Routinely performed on polluted waters only.

PARAMETER	ANALYTICAL METHOD	PREFERRED PRESERVATION METHOD	MINIMUM DETECTABLE (mg/l) except where otherwise noted	MAXIMUM STORAGE PERIOD	MINIMUM VOLUME
ORGANIC (N) + (Kjeldahl)	digestion-distillation: (2, 3) titration or Nesslerization (2, 3)	40 mg $HgCl_2$ per liter. Freeze. Keep frozen in transit.	<.1 (as N)	Variable: Many organic N compounds are intrinsically unstable no matter how preserved.	500 ml
NTA + (Nitrilotriacetic Acid)	Zinc-Zincon (1)	"	0.5	24 hrs. or less if possible. NTA is biodegradable.	100 ml
ODOR	Organoleptic (2)	None required.	1 unit (but usually reported as < 3)	Indefinite, but is to be performed as soon as the bottle is opened.	200 ml *
OIL AND GREASE (HYDROCARBONS)	Hexane extraction (1) Trichloro trifluoromethane extraction (2) Infra-red after CCl_4 extraction (3)	2 ml H_2SO_4 per liter, transmit in glass bottle, do not seal bottle with wax. Do not fill bottle.	0.2	Variable - Analyze as soon after receipt as possible.	500 ml
pH	Direct potentiometric (1, 2, 3)	None required.	0.1 - 14 units	Determine on-site where possible: change in pH between field and laboratory reflects other changes in water characteristics.	50 ml *
PHENOLS	Amino Antipyrine (1, 2, 3) Extraction - photometric	1 gram $CuSO_4$, 1 ml H_3PO_4 per liter; (pH ~4) Freeze.	1 microgram/liter	24 hours for most accurate results.	1 liter
PHOSPHORUS: Ortho-Phosphate	heteropolymolybdenum blue (1, 2, 3)	Add 40 mg $HgCl_2$ per liter. Freeze. Keep frozen in transit.	.01 (as P)	7 days for most accurate results.	100 ml
TOTAL-PHOSPHATE	Acid-persulfate digestion heteropolymolybdenum blue (1, 3)	"	.01 (as P)	"	100 ml
POTASSIUM	Atomic Absorption (1, 2, 3)	None required.	.01	indefinite	50 ml *
SILVER	"	5 ml HNO_3 per liter	.01	"	50 ml
SURFACTANT:	See Methylene Blue Active Substances (above).				
SOLIDS: TOTAL SUSPENDED VOLATILE	Evaporation-weight (1, 2, 3) ignition-weight	None required.	1.0	"	100 ml*
SELENIUM	Piazselenol (1, 2, 3) Chronophotometry (3)	None required.	<.01	"	1000 ml *
SILICA	Silicomolybdate (1, 2, 3)	None required.	.1	"	100 ml *
SODIUM	Atomic Absorption (1, 2, 3)	None required.	.01	"	50 ml *
SPECIFIC CONDUCTANCE	Wheatstone Bridge	None required.	--	"	50 ml *
SULFATE	Turbidimetric (1) Gravimetric (2) Autoanalyzer-Barium (3)	Refrigerate (especially polluted waters)	3	7 days for most accurate results.	50 ml *
SULFIDE +	Titrimetric (1) Colorimetric (2) Specific ion electrode (3)	Add 2 ml Zinc Acetate (10%) per liter, sufficient Sodium Acetate to bring pH above 7.0, if necessary.	.05	7 days for most accurate results.	100 ml *
TOXICITY TO + FISH	Bioassay	None required.			5 gal, preferably 10 gal.
TURBIDITY	Jackson Candle (2) Nephelometry (1, 2, 3)	None required.	0.1 J.C.U.	7 days for most accurate results.	500 ml *
VANADIUM +	Gallic Acid (1, 3)	None required.	3 micrograms/l	7 days for most accurate results.	50 ml*
ZINC	Atomic Absorption (1, 2, 3)	5 ml HNO_3 per liter	.01	indefinite	50 ml *

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APPENDIX V

Field Survey Authorization

1. Request for Survey
2. Personnel Contacted at Eielson AFB

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ALASKAN AIR COMMAND
APO SEATTLE 98742

REPLY TO ATTN OF: SGB (Capt Reid/752-4282) 18 MAY 1972

SUBJECT: Pollution Survey Assistance

TO: HQ AFLC/SGP

1. Assistance is requested to improve existing water pollution monitoring programs at Eielson AFB and Elmendorf AFB. This request is made in accordance with paragraph 5b(2)(a), AFR 19-1.

2. Preliminary surveys have been completed by the bioenvironmental engineers at both installations. The nature and extent of assistance needed can best be determined after Environmental Health Laboratory personnel have studied the reports and coordination with the base bioenvironmental engineers concerned.

FOR THE COMMANDER

J. O. HIGHTOWER, JR, Colonel, USAF, MC
Director of Professional Services
Office of the Surgeon

2 Atch
Survey Elmendorf AFB
Survey Eielson AFB

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE LOGISTICS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

REPLY TO ATTN OF: SGP

6 July 1972

SUBJECT: Pollution Survey Assistance

TO: USAF Environmental Health Lab/CC
Kelly AFB TX 78241

The attached request for water pollution surveys at Eielson AFB and Elmendorf AFB, Alaska, is forwarded for your action.

FOR THE COMMANDER

Donald D Higgins

DONALD D. HIGGINS, Lt Col, USAF, BSC
Chief, Bioenvironmental Engineering Division
Office of the Surgeon

1 Atch
AAC/SGB ltr
18 May 72 w/2 Atch

Cy to: AAC/SGB

72-32 Eielson
72-33 Elmendorf

PERSONNEL CONTACTED AT EIELSON AFB

1. Capt Richard Costello, BEE, USAF Hosp
2. TSgt Myron A. Hoyt, NCOIC Environmental Health Services
3. TSgt Eddie B. Norwood, Preventive Med Tech
4. SSgt Joseph E. Vogt, Preventive Med Tech
5. Sgt Robert J. Kerin, Preventive Med Spec
6. Maj Vernon L. Seese, USAF Hosp Administrator
7. Mr Thomas Leshorn, Mechanical Engineer and EPO 5010th CES
8. Mr John Campbell, Deputy Civil Engineer 5010th CES
9. SSgt John McCarthy, NCOIC Corrosion Control, 5010th CAMS
10. TSgt Clarence Wondergem, NCOIC NDI, 5010th FMS
11. MSgt Max Picking, NCOIC Maintenance Flight, 6th CAMS
12. MSgt Harry Aford, Inspection Branch Chief, 6th CAMS
13. MSgt Robert Cole, NCOIC Fuel Systems Repair, 6th CAMS
14. MSgt Donald Porter, NCOIC 5010th CAM's AGE
15. 1Lt Gary Kelly, OIC, OM
16. MSgt Mitchell, Maintenance Superintendent
17. Mr Harry E. Morris, Chief Heat and Power Section
18. Mr John Rubel, Shift Foreman, Heat and Power Section
19. SSgt Forrest R. Hodge, NCOIC, Dets, 1365th Photo Sq
20. Maj Gary R. Morris, CO, 5010th Transp Sq
21. Capt Mike Will, Maintenance Officer, 5010th Transp Sq
22. Mr Stevens, Shop Foreman, 5010th Transp Sq
23. SSgt O'Berry, 5010th Transp Sq
24. Mr Norman K. Bond, 5010th Transp Sq
25. Mr Roy Wilkinson, Foreman, Water Treatment Plant
26. Mr James O'Neil, Work Leader, Sewage Treatment Plant
27. TSgt Del Deboe, NCOIC, Sewage Treatment Plant
28. Mr Jack Howard, Chief Sanitation Branch.
29. Mr Robert Probert, Foreman, Sanitation Services
30. TSgt Elwin Trask, Entomology Section
31. Mr Wallace Triplett, Jr., Fire Chief
32. SSgt Thomas Grant, Stock Control Shop

UNCLASSIFIED

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USAF ENVIRONMENTAL HEALTH LABORATORY
Kelly AFB TX 78241

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Eielson AFB, Alaska

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CHESTER F. PAULS, Captain, USAF, BSC

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11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY

13. ABSTRACT A wastewater survey was accomplished at Eielson AFB, Alaska during the period of 22-27 June 1973. Wastewater sources, discharge routes and treatment processes were evaluated during the survey. Recommendations were made for future handling of wastes from specified operations. A sampling and analyses program was outlined so that compliance with applicable water quality standards could be demonstrated on a continuing basis. Performance specifications were recommended for the sanitary sewage treatment plant.

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Industrial Wastewater						
Sanitary Wastewater						
Waste Oil Disposal						
Performance Specifications						
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